Andrew D. Ferguson

CONTACT INFORMATION	Box 1910, Brown Univ. Comp. Sci. *E-mail:* adf@cs.brown.edu

CONTACT INFORMATION

Box 1910, Brown Univ. Comp. Sci.
115 Waterman St, 4th Flr
Providence, RI 02912

E-mail: adf@cs.brown.edu
WWW: http://www.cs.brown.edu/~adf

INTERESTS

Networks, distributed systems, operating systems, security

EDUCATION

Brown University, Providence, Rhode Island USA
Ph.D. Candidate, Computer Science, *In Progress since Sept. 2009*
M.S., Computer Science, awarded May 2011
- Advisor: Prof. Rodrigo Fonseca

Princeton University, Princeton, New Jersey USA
B.S.E. with Honors, Operations Research and Financial Engineering, June 2008
- Certificates in Applications of Computing, Applied and Computational Mathematics, and Engineering and Management Systems

HONORS AND AWARDS

- Awarded National Defense Science & Engineering Graduate Fellowship (2011-2014)
- NSF Graduate Research Fellowship (2011), Honorable Mention
- Student travel grants: GEC 15, NSDI 2012, EuroSys 2012, NSDI 2011, CoNEXT 2010, NSDI 2010
- Outstanding Academic Achievement in the B.S.E. Program (Fall 2004, Spring 2006, Fall 2006, Spring 2008)
- Elected to the Society of Sigma Xi
- National Merit Scholarship Winner
- Advanced Placement Exams National Scholar
- Mercer County Society of Professional Engineers' merit scholarship

PUBLICATIONS

T. Nelson, A. D. Ferguson, M. J. G. Scheer and S. Krishnamurthi. Tierless Programming and Reasoning for Software-Defined Networks. In *USENIX NSDI 2014*, Seattle, WA, April 2014.

A. D. Ferguson, J. Place, and R. Fonseca. Growth Analysis of a Large ISP. In *ACM Internet Measurement Conference 2013*, Barcelona, Spain, October 2013. *Nominated for the Community Contribution Award.*

A. D. Ferguson, A. Guha, C. Liang, R. Fonseca and S. Krishnamurthi. Participatory Networking: An API for Application Control in SDNs. In *ACM SIGCOMM 2013*, Hong Kong, China, August 2013.

Y. Chen, A. D. Ferguson, B. Martin, A. Wang and P. Wendell Big Data and Internships at Cloudera. In *XRDS: Crossroads, The ACM Magazine for Students*, Fall 2012.

A. D. Ferguson, A. Guha, C. Liang, R. Fonseca and S. Krishnamurthi. Hierarchical Policies for Software Defined Networks. In *Hot Topics in Software Defined Networks (Hot-SDN) 2012*, Helsinki, Finland, August 2012.

A. D. Ferguson, A. Guha, J. Place, R. Fonseca and S. Krishnamurthi. Participatory Networking. In *Hot Topics in Management of Internet, Cloud, and Enterprise Networks and Services (Hot-ICE) 2012*, San Jose, CA, April 2012.

A. D. Ferguson, P. Bodik, S. Kandula, E. Boutin and R. Fonseca. Jockey: Guaranteed Job Latency in Data Parallel Clusters. In *ACM EuroSys 2012*, Bern, Switzerland, April 2012.

A. D. Ferguson and R. Fonseca. Inferring Router Statistics with IP Timestamps. In *ACM CoNEXT 2010 Student Workshop*, Philadelphia, PA, Nov. 2010.

A. D. Ferguson and R. Fonseca. Understanding Filesystem Imbalance in Hadoop (Poster). In *USENIX Annual Technical Conference 2010*, Boston, MA, June 2010.

CURRENT RESEARCH	**Participatory Networking** `http://pane.cs.brown.edu` • We are developing a new platform for managing network resources by allowing end-users and their applications to safely, securely, and collaboratively manage such resources for themselves. This platform, which we term "Participatory Networking," forms the next layer in Software Defined Networks by providing "system calls" for non-administrative users. **Analysis of ISP Networks** • By combining passive network measurements with a detailed analysis of publicly available data, we are seeking to give researchers and smaller ISPs greater visibility into the construction and utilization of Tier 1 ISP backbones. **Task Scheduling and Block Placement in Hadoop** • We are working to understand cluster workload characteristics and improve task scheduling in the Hadoop platform for MapReduce. Previously, we explored optimizing data layout in the Hadoop distributed filesystem, and are currently building a new filesystem for Hadoop integrating recent advances in database research.
RESEARCH EXPERIENCE	**Utility-based Cluster Scheduling** • Working with colleagues at Microsoft Research, we developed scheduling mechanisms for MapReduce-style clusters which maximize global utility of compute jobs, and are capable of meeting service-level agreements (SLAs) with high probability. **Princeton Election Consortium** `http://election.princeton.edu` • Assisted Prof. Samuel S.-H. Wang with creating and refining statistical models for the most accurate meta-analysis prediction of the 2008 election, and among the most-accurate predictions for 2012. Developed the automated website infrastructure and prepared scientific graphics. Our work has been featured in many venues including *The Wall Street Journal*, *NPR*, *IEEE Spectrum*, and *The Atlantic*, among other publications. **Exploring the Yeast Genome with Generalized Singular Value Decomposition** *Senior independent work, Princeton University* • Applied a novel technique from matrix analysis to compare data previously clustered using hierarchical methods, yielding a substantial processing speed-up while reproducing and extending previous results.
TEACHING EXPERIENCE	**Brown University** • Teaching Assistant, Distributed Computer Systems, Spring 2012 • Teaching Assistant, Computer Networks, Spring 2011
INVITED TALKS	"Introduction to MapReduce." Brown University, CSCI 2950-T, Sep. 14, 2012. "Participatory Networking." UC Berkeley, Networks Lunch, April 23, 2012. "MapReduce Fundamentals." Brown University, CSCI 1950-S, Feb. 10, 2012. "Hadoop Research at Brown." Cloudera, Inc., Nov. 3, 2011. "Hadoop Research at Brown." Brown University, CSCI 2950-U, Oct. 27, 2011.
PROFESSIONAL SKILLS	Comfortable working in Python, Java, Haskell, C, Scheme/Racket, MATLAB, PHP, C++, S-Plus, HTML, CSS, SQL, JavaScript, and Bash shell script. Familiar with the installation and configuration of Hadoop, Apache, MySQL, Samba, DHCP, DNS, and e-mail services on Linux and Mac OS X.
INDUSTRY EXPERIENCE	**Google, Inc.** Mountain View, California USA *Software Engineering Intern* **June 2013 - Sep. 2013** • Worked with the platforms networking group to build the next generation of Google data centre networks.

Cloudera, Inc. Palo Alto, California USA

Research Intern **May 2012 - Aug. 2012**

- Worked with the platform development team to improve resource management across the Hadoop ecosystem. Primarily focused on integrating Linux cgroups and long-term planning.

Microsoft - Microsoft Research Redmond, Washington USA

Research Intern **May 2011 - Aug. 2011**

- Worked in the Internet Services Research Center, developing resource management algorithms and performing analysis for the Bing infrastructure teams.

Princeton University - Office of Information Technology Princeton, New Jersey, USA

Software Support Specialist **Aug. 2008 - July 2009**

- Supported University business applications and repaired Mac OS X, Windows XP, and Vista platforms for faculty and staff across campus.
- Identified, analyzed, and resolved with Apple a bug in the DHCP client implementation of Mac OS X which impacted campus network performance.

Residential Computing Consultant **Sep. 2005 - June 2008**

- Supported computers in students dorms on all platforms. Prepared and presented several training talks to increase the knowledge of other student computing consultants.

New Media Center - Student Consultant **Sep. 2004 - Jan. 2008**

- Assisted customers with multimedia projects including video, audio, and image editing, DVD production, website development, and content conversion.

Goldman, Sachs & Co. New York, New York USA

Summer Analyst **June 2006 - Aug. 2006**

- Worked as a software developer using Java, Swing, and a proprietary object-mapping framework in the Firmwide Technology group.

Overseas Market Development Corporation Princeton, New Jersey USA

Technical Consultant **Sep. 2005 - Aug. 2007**

- Consulted on the development of an international business website including selection and customization of a content management system (PHP-based Mambo), interfacing with the company's contact registry (Goldmine), and design of advertising copy and sell sheets.

PROFESSIONAL SERVICE

Open Source Contributions

- Past maintainer of Rdiff-Backup, a Python-based cross-platform backup solution using the rsync algorithm in use worldwide. Prepared Windows port and improved file extended attribute handling on Mac OS X.
- Former developer for AfterStep Window Manager, focused on configuration files and GUI.
- Patches included in Floodlight, Hadoop, Python, ZooKeeper, Samba, and the SWIM Benchmark for Hadoop.

USENIX *;login*

- Wrote summary reports of talks given at INM/WREN 2010, NSDI 2010, NSDI 2011, and NSDI 2012 for USENIX *;login* magazine.

Brown University - Information Technology Advisory Board (2009-2013)

- Elected representative to committee charged with studying the use of technology on campus and advising the university leadership on technology decisions.

Brown University - University Resources Committee (2012-2013)

- Elected representative to committee which makes University-wide financial decisions on topics such as salaries, tuition, financial aid, and budget requests.

Brown Computer Science - Ph.D. Recruiting (2010-2011)

- Co-organizer of visits for admitted Ph.D. students, including planning three-day recruiting weekend featuring faculty and student speakers, campus tours, and multi-department party.

Brown Computer Science - Research Exchange Seminars with Tea (REST)
`http://rest.cs.brown.edu`

- Co-organizer of weekly talk series by computer science graduate students designed to foster collaboration and disseminate new techniques across subfields.

Brown Computer Science - Systems Lunch / Reading Group

- Coordinator for weekly systems lunch / reading group.

PATENTS   P. Bodik, A. D. Ferguson, S. Kandula, and E. Boutin. Computing Cluster with Latency Control. *Provisional U.S. application #13/372,717 filed.*

RELEVANT COURSEWORK

Brown University

- Distributed Computer Systems *Prof. Tom Doeppner*
- Database Management Systems *Prof. Stan Zdonik*
- Topics in Parallel and Distributed Computing *Prof. Maurice Herlihy*
- Topics in Distributed Databases and Systems *Prof. Uğur Çetintemel*
- Special Topics on Networking and Distributed Systems *Prof. Rodrigo Fonseca*
- Online Algorithms *Prof. Claire Mathieu*

Princeton University

- Systems and Networking for Virtual Worlds *Prof. Mike Freedman*
- Computer Networks *Prof. Jen Rexford*
- Advanced Programming Techniques *Prof. Brian Kernighan*
- Operating Systems *Prof. Kai Li*
- Analysis & Visualization of Large-Scale Genomic Datasets *Prof. Olga Troyanskaya*
- Interacting with Data *Prof. Robert Schapire* and *Prof. David Blei*
- Artificial Intelligence *Prof. David Blei*
- Optimization *Prof. Alexandre d'Aspremont*
- Discrete Math *Prof. Moses Charikar*

UPDATED   March 2, 2014